

AGENDA

Teaching Pre-School and Kindergarten Math

OVERVIEW

This course offers teachers of young children hands-on experiences with instructional strategies that promote thinking and reasoning, exemplified in the Mathematical Practices of the *Common Core State Standards for Mathematics*. Video clips are used to bring teachers into the young child's classroom to see students grapple with counting and building and dealing with data. Participants have multiple and varied opportunities to consider instructional decisions, differentiation, and assessment.

OUTCOMES

- Understand the importance of establishing safe and accepting environments for young learners
- Analyze and characterize levels of proficiency as students develop counting skills
- Use formative assessment techniques to make decisions about appropriate learning tasks
- Understand the importance of using familiar objects for the purpose of establishing safe and accepting environments for young learners
- Examine sorting, classification, and counting activities to develop reasoning skills
- Use information gained in one formative assessment to build challenges for students at their own level of proximal development
- Understand the importance of establishing safe and accepting environments for young learners
- Analyze, compare & characterize types of learning into social & logical mathematical knowledge learning
- Explore tools and techniques that support the development of number sense.
- Using "Tools for Thinking," to make sense of number, participants reflect on personal experiences
- Examine the mathematical patterns found in counting books to support and challenge students at their own level of proximal development; and
- Refine assessment and observation skills to determine appropriate levels for student engagement.

DAY 1

WELCOME, INTRODUCTION, AND OVERVIEW

This introduction includes the course goals, an explanation of the structure and layout of the course, an overview of the Common Core State Standards and pertinent logistical information. Participants' names are used for a community building experience.

ESSENTIAL UNDERSTANDINGS OF COUNTING

Participants actively collect observations about counting while counting a collection of small objects with a partner. They keep a record of all of the behaviors of their partner while they count. Together, participants compile a list of adult counting behaviors to set the framework for understanding how young children learn to count. Videos of young children counting deepen discussions about essential understandings of counting.

LUNCH

COUNTING BY 7'S

An adult counting experience provides participants insights into children's strategies for counting.

COUNTING MENU

Counting is a cornerstone in developing understandings about numbers. Children who aren't proficient counters struggle in elementary school.

In this session, participants explore activities appropriate for building a foundation in counting. They match an activity to the formative assessment information obtained from viewing the counting videos, and state why they think the activity meets the needs of the child. They identify ways to enhance student access and engagement in counting tasks. At the close of this session, participants share their own classroom experiences dealing with appropriate and inappropriate counting activities they have seen in their practice.

DAY 1 CLOSING

Participants take time to reflect on the experiences from the day and how the experiences will impact their classroom instruction. The course goals are revisited and connections are made from the activities and experiences to what participants do in their own classroom. A homework assignment deals with assembling a collection and performing a counting assessment.

DAY 2

OPENING

This introduction includes the course goals, an overview of the goals for the day, pertinent logistical information, and a check in with the participants.

WHICH WOULD YOU RATHER BE?

Participants listen to a piece of children's literature asking the question, "Which would you rather be?" Participants then sort themselves based on the same question and justify their reasons.

SORTING THEN CLASSIFYING

Using the structure of a dichotomous key, participants engage in a series of tasks that focus on sorting and classifying collections of items. This experience gives teachers an opportunity to think deeply about sorting and classifying. Often "sorting and classifying are used synonymously, but they actually represent two separate levels of logical thinking". (David A. Sousa, *How the Brain Learns Mathematics*, 2008)

ESSENTIAL UNDERSTANDINGS OF COUNTING

Participants have the opportunity to reflect on assessments and essential ideas about counting.

LUNCH

COUNTING COLLECTIONS

A classroom "Collection Museum" is a powerful imaginative resource for young children. The display invites perusal, suggests sorting, and can be quantified. In this session participants create their own collections and consider the pedagogical decisions a teacher makes to maximize the learning opportunities of an experience.

HOW MANY DAYS UNTIL YOUR BIRTHDAY? HOW MANY DAYS SINCE YOUR BIRTHDAY?

Participants solve a problem that calls for analyzing and collecting data, counting, computing, and looking for patterns.

DAY 2 CLOSING

Participants take time to reflect on the experiences from the day and how the experiences will impact their classroom instruction. In addition, participants talk with their colleagues about experiences that were particularly meaningful and the impact those experiences will have in their classrooms. Participants complete the evaluation form.

DAY 3

OPENING

This introduction includes the course goals, an overview of the goals for the day, pertinent logistical information, and an opportunity to review the homework assignment related to calendar.

TEXT BOOK

A simulated textbook lesson with emphasis on abstract number ideas will be presented. Participants consider how young children are typically introduced to number ideas in ways where they do not make meaning for themselves.

HOW CHILDREN LEARN

This session focuses on a view of learning in which people construct their own understanding of mathematical concepts and relationships through interactions between their minds and concrete experiences.

LUNCH

WHEN IS IT MY DAY?

Participants reflect on pattern differences between the numbers on a hundred chart and those on the calendar. The Mathematical Practices in the Common Core State Standards expect students to look for and make use of structure. The structure of the hundred chart provides opportunities for students to notice patterns in our place value system. Reading an article provides background and launches conversations about reasonable learning goals for calendar time with young students.

TOOLS FOR THINKING

In the previous session participants were introduced to numbers as symbols. In contrast, when students begin to see numerical relationships (i.e. that three and two are contained in five), then they can use this information to make sense of the quantity the numerals represent. In this session participants experience the tools that help build young children's number sense.

DAY 3 CLOSING

This session is devoted to the important process of professional reflection. Participants take time to reflect on the experiences from the day and how the experiences will impact their classroom instruction.

DAY 4

OPENING

This introduction includes an overview of the goals for the day, pertinent logistical information, and check in with the participants. Participants will share and review the tools for thinking that they have practiced in their own classrooms for successes and challenges toward student learning outcomes.

TEN BLACK DOTS

Participants are involved in experiences that relate to patterns in counting books, both as teachers of young children and as learners of mathematics. Participants listen to the story, calculate the number of dots needed to make a ten black dot book, and share strategies. Collegial conversations focus on the use of counting books with students.

FIVE LITTLE SPECKLED FROGS

Participants are involved in experiences that relate to composing and decomposing numbers within the context of a singing rhyme. Instead of adding one more as in the Ten Black Dots book, this rhyme begins with five frogs and one-by-one each frog jumps into the pool.

Participants are engaged in making relationships using manipulative materials that display how complex a number like four, five or six can be for a young child to conceptualize.

LUNCH

PHYSICAL EXPERIENCES TO BUILD NUMBER IDEAS

Teachers read the article “Arithmetic for First Graders Lacking Number Concepts” by Constance Kamii and Judith Rummelsburg, which raises the issue of the need to engage students in thinking about number ideas using physical activities. Two games are introduced to illustrate making a link between a physical activity and building understanding about numbers. Young children who do not yet have a strong sense of number are engaged in this kind of game and begin to build their number ideas.

ASSESSMENT REVISITED

Participants build on their experiences from the previous three days and review what they now know about young children’s counting and use that information to think about their own teaching and assessment plans. Video clips are used to provide practice recording on formative assessment tool.

REFLECTION AND COURSE CLOSING

Throughout the course, participants have many opportunities to reflect on what they learn from their sessions and homework assignments and engage in conversations with colleagues with a focus on the role of the teacher to choose learning experiences that make sense and meet the needs of young children. This processing session provides a final opportunity for participants to look back on the experiences in this course, reflect on what they’ve learned, and set expectations for putting what they learned into practice.

MATH SOLUTIONS GUIDING PRINCIPLES

Drawing upon academic work and our own classroom-grounded research and experience, Math Solutions has identified the following four instructional needs as absolutely essential to improving instruction and student outcomes:

- Robust Content Knowledge

Math Solutions Course Agenda: CCSS—Teaching Pre-School and Kindergarten Math

- Understanding of How Students Learn
- Insight into Individual Learners through Formative Assessment
- Effective Instructional Strategies

These four instructional needs drive the design of all Math Solutions courses, consulting and coaching. We consider them our guiding principles and strive to ensure that all educators:

- Know the math they need to teach—know it deeply and flexibly enough to understand various solution paths and students’ reasoning.
- Understand the conditions necessary for learning, what they need to provide, and what students must make sense of for themselves.
- Recognize each student’s strengths and weaknesses, content knowledge, reasoning strategies, and misconceptions.
- Have the expertise to make math accessible for all students, to ask questions that reveal and build understanding, and help students make sense of and solve problems.